STRATEGY FOR ROBOTIC TECHNOLOGY IN ELDERLY CARE

Overview of the initiative

Title: Strategy for robotic technology in elderly care

Country: Japan

Thematic area: Robotics, elderly care

Objective(s): Promotion of development and introduction of robotic devices for nursing care, which will contribute to the independence of the elderly and the reduction of the burden on caregivers.

Timeline: The first strategy was established 2013 and had a time span until 2018. The strategy has been revised 2015, and is looking ahead to 2025.

Scale of the initiative: 60 million Euros (8 billion yen) for the fiscal year 2017

Scope of the initiative

- Focused on new knowledge creation (basic research, TRLs 1-4): Yes
- Focused on knowledge application (applied research, TRLs 5-9): Yes

Source of funding (public/private/public-private): Public, aims also to mobilise and redirect private funding.

Granularity of the initiative (initiative, policy approach): Policy approach

Source (webpage):
http://www.meti.go.jp/english/policy/mono_info_service/robot_industry/index.html
http://robotcare.jp

Brief description of the initiative:
The Japanese strategy for robotic technology in elderly care focuses on promoting the development and the introduction of robotic devices for nursing care. The objective is to contribute to the independence of the elderly and the reduction of the burden on caregivers. The main administrative vehicle to implement the strategy is a strategic project, managed by METI and MHLW, to subsidize enterprises and other entities which develop robotic devices for nursing care in the eight priority areas. Theses priority areas were jointly identified by METI and MHLW based on the needs at actual nursing care sites. Another main component of the implementation plan is preparing the environment necessary for introducing robotic devices into such facilities, including formulating standards.
(Source: METI)

I: Background, origin, mission and ambition

Ia: **Origin**
The state initiative related to care robots began in 2010, when the government presented its vision for the promotion of the development and implementation of care robots as part of the New Growth Strategy. The Committee on Care/Welfare Robot Dissemination was established, and a discussion concerning how to best promote care robot use was generated thereafter.

In 2013, the Japan Revitalization Strategy and a five year Plan for the Development of Care Robots was approved by the Cabinet. The Ministry of Economy, Trade, and Industry (METI) and the Ministry of Health, Labour, and Welfare cooperated in creating large-scale funding systems to support care robot projects nationwide. Eight priority areas were established where robotic technology is to be introduced in nursing care for the elderly. A funding scheme for care robots to relieve the burden of care workers was established in 2014 in order to assist the relevant projects.

In 2015, Japan's Robot Strategy was presented, and the use of robots in the care and health sector was one of the five focus areas. The supplementary budget for the 2015 fiscal year incorporated financial support involving as much as 5.2 billion yen for the promotion of care robots. The main instrument for attaining the strategy is the Robot Revolution Initiative which was established in May 2015.

(source: Ishiguro 2017)

Ib: Initiator
The government of Japan.

Ic: Mission and ambition
The strategy aims to support and promote the development, practical application, and introduction of robotic care equipment, and to create an environment for the preparation of standards necessary to introduce robotic equipment into nursing care settings. Four main motivations have been identified (based on analysis of policy documents by Ishiguro 2017):

1. Workload reduction – care robots can reduce the physical and mental burden of care work, and can lessen care worker turnover
2. Independent living and quality of life – robots will help older people to live more independently, thereby maintaining their dignity and enhancing their quality of life
3. Industry promotion – enhancement of the care robot industry and contribution to overall growth in the domestic robot industry.

4. Productivity improvement – enhancement of efficiency and productivity of care work which is labour intensive and suffers from constantly increasing costs.

The targets for 2020:

1. Expand the domestic market scale of nursing care robots to 50 billion yen.
2. Lower the risk of care givers of suffering from a backache to zero by using nursing care robots for helping the aged transfer.
3. Change the awareness of nursing methods using the newest robot technology: (a) Increase the percentage of people who wish to use nursing care robots for providing care to 80% from the current 59.8%. (b) Increase the percentage of people who wish to have robots used when undergoing care to 80% from the current 65.1%

Id: Decision making process

The decision-making has progressed through various stages as part of larger agenda setting. First, in conjunction with the New Growth Strategy in 2010. Second, as a key measure in Japan Revitalization Strategy in 2013. And most latest, as a major application area of the more general Japan's Robot Strategy and the Robot Revolution Initiative in 2015. The strategy has been constantly revised and appears rather an evolving strategic agenda than a fixed unitary programme.

Ie: Linkage to other governance levels

Partnerships with other advanced nations (US, Germany) are promoted at the policy level. Links with the regional and local levels are not highly visible, apart from individual projects and pilots taking place in particular locations (e.g. care robot pilots).

If: Geographical scope

National / one country.

Ig: Time span

Targets have been set for 2020 and 2025.

II: Formation

IIa: Driving forces

- Aging – It is expected that the number of the aged 65 years or older would increase by about 7.09 million over 15 years from 2010 to 2025. The population aging rate of the entire society (ration of the aged to the total population) substantially surges from 23% to 30%, giving rise to an increase in needs of medical care and nursing.
- Shortage of care workforce – The baby boom generation reached 65 years or older in 2012 to 2014 – an increase of more than one million of the aged per annum. Consequently, the necessary number of care workers is said to rise from 1.7 million of 2012 to about 2.5 million in 2025.
- Occupational health – It is reported that 70% of nursing care workers who are currently working are suffering from a backache, calling for mitigation of the workload at care-giving sites.
- Independent living – Japan is promoting integrated community care system, under which people can receive long-term care, medical care, preventive care, livelihood support and housing in an integrated manner in communities and can continue to live in their home towns even when they have come to need long-term care.

Key actors:

- The Ministry of Economy, Trade and Industry (METI): oversight of the robotics industry development
- The Ministry of Health, Labour, and Welfare (MHLW): sector policy for social and elderly care
- NEDO: Operative arm in the robotics strategy implementation.
- AMED: To deliver the funding for care robotics, Japan Agency for Medical Research and Development (AMED) was established in 2015.
- Japan Robot Association (JARA) – industry association to develop robots with official members of 32 companies and associated members of 128 companies (2017)
- Key research organizations involved are AIST (Robot Innovation Research Center), Tokyo Metropolitan University, Tokyo University, RIKEN Institute etc.
- As for standards formulation and evaluation the key partners are National Institute of Advanced Industrial Science and Technology (AIST), Japan Quality Assurance Organization (JQA), Aichi Medical University Applied Vision Systems (AVS), Japan Automobile Research Institute (JARI), National Institute of Occupational Safety and Health, Nagoya University, Japan Assistive Products Evaluation Center (JASPEC), Japan Robot Association (JARA), and Japan Assistive Products Association (JASPA).

IIb: Approach

What was the approach adopted (top down / bottom-up; open / closed)?
No detailed information about the nature of the process was found.

IIc: Citizen involvement

There is no indication of extensive citizen involvement in the formulation and deployment of the strategy. The acceptability of care robotics among the public and care workers has been closely assessed. Also, the current

	development strategy pays much more attention to the service design than previous generations of robotics innovation programmes which have mainly focussed on conventional technical system design issues. More attention is put to understanding the benefits that robotics can deliver as part of the care processes and human life. Also, safety verification is a primary concern.
III: Technical and political feasibility	
	IIIa: Technical feasibility assessment The technical feasibility of robotics solutions are reviewed at the project level in practical demonstrations, pilots and field tests. No information about any macro level feasibility analysis was found.
	IIIb: Ex ante technical and risk assessment Were the technical and other risks properly assessed ex ante? Was a contingency plan made? Was an independent/internal ex ante Cost-Benefit Analysis done or was a foresight done before launching the initiative? No information about systematic risk assessments was found. Risks have been evaluated at project and technology level.
	IIIc: Success factors The major factor is Japan's leadership in robotics, particularly in the manufacturing sector. Extension of that knowledge and capability to service sectors, and more particularly to care sector, was identified as a significant opportunity. The gaps were related to both solving various technical issues, but more importantly to increase the technology's social acceptability, remove regulatory barriers, establish safety standards and verify the solutions against those standards.
	IIId: Incentives Incentives provided: R&D subsidies, standards development, removal of regulatory barriers, user-driven design, pilots and 'social verification' projects, acceleration of medical product approval process for care robots, and making rental of care robots eligible for public medical insurance.
	IIIe: Political and societal assessment Societal drivers have been extensively studied due to the challenging demographic structure of Japan ('hyper-aging society').
	IIIf: Interim political and societal assessment No information was found on the democratic aspects of the process. The process appears driven by the cabinet and the public administration in the key ministries (METI, MHLW).
	IIIg: Financial risk assessment No information about financial risk assessments was found.
IV: Governance: organisation, management and coordination	
	IVa: Governance The Robot Revolution Realization Council, hosted by the Prime Minister's Office, oversees the progress. The two ministries, METI and MHLW, are responsible for the implementation of the strategy. Administration of funding has been entrusted to the Japan Agency for Medical Research and Development (AMED), a funding body that was established in 2015.
	IVb: Progress monitoring The government will review the progress achieved on the basis of information provided by the ministries and agencies.
	IVc: Public-private involvement Both research establishments and private companies are involved in the process: - Research: Many of the robots introduced are still in the laboratory stage in universities and research institutes. - Industry: Several industrial firms have entered the care robotics space including Panasonic, Softbank, Yaskawa, Toyota, and Cyberdyne.
	IVd: Communication and dissemination No detailed information about communication strategies were found.
V: Resources and budget needs/availability	
	Va: Scale The government has allocated 60 million Euros (8 billion yen) for advancement of care robotics for 2017.
	Vb: Funding sources Public
	Vc: Allocation of the budget The budget is allocated to two principal schemes: 1. Subsidies – Provision of subsidies to private enterprises that desire develop products in priority areas. Its purpose is to encourage the development and practical application of robotic care equipment. Priority areas: (1) Wearable transfer aids, (2) Toileting aids, (3) Outdoor mobility aids, (4) Monitoring systems for nursing care homes, (5) Non-wearable transfer aids, (6) Bathing aids, (7) Indoor mobility aids, and (8) Monitoring systems for private homes.

2. Standards – This scheme publicizes the introduction of robotic care equipment into nursing care home, new nursing care programs that make use of related technologies, research on demonstration guidelines and standardization, and development and introduction guidelines.

VI: Policy mix and integral ('holistic') use to deploy mission-oriented R&I-initiatives

VIa: Policy mix

1. Research and development subsidies to research institutes and companies
2. Standards establishment and evaluation
3. Regulation: achieving a "robot barrier free" society through regulatory reform

VIb: Engagement of citizens

No information was found. In general, robotics is subject to active public debate in Japan..

VII: Embeddedness of and connectivity with related initiatives (regional, national, supranational, global)

VIIa: Relationships/links/synergies to similar initiatives elsewhere

Intensive linkages have been established with robotics initiatives in the United States, and Germany, including the broader scope of automation, internet of things (IoT) and artificial intelligence (AI). In other fields of robot application, such as disaster field robots, there is intensive collaboration with the US.

VIIb: Links to UN Sustainable Development Goals

The care robotics strategy aims to contribute to the Good health and wellbeing target of the UN Sustainable Development Goals. Evaluation of whether it actually makes a contribution, as assessed by the elderly people being provided with robotic devices, is too early. It is also possible that care robotics can make a contribution to care givers' work conditions and care productivity sooner than to the actual elderly people being cared for.

VIII: SWOT analysis

VIIIa: Strengths

Strong technological basis, Japan's leadership in robotics.

VIIIb: Weaknesses

The agenda is still rather technology driven. Collaboration between the government, industry and research institutes is not extensive. Many of the robotic solutions are developed in laboratory without engagement of patients, care workers, and stakeholders. This situation has appears to have improved considerably over the latest years, but the user engagement in design, development and demonstration of robotic solutions appears insufficient for the widespread adoption.

VIIIc: Opportunities

The nature of robotics as an enabling technology permits its application to a wide variety of purposes on global scale.

VIIId: Threats

If the strategy fails to deliver real and economically reasonable solutions to actual care practice, it is under the risk of staying in the margin without widespread social acceptability.

VIIIe: Lessons learned

An R&D agenda with a strong technology-push approach can be accelerated by promoting its application to traditional service domains with a more systemic approach targeting measures to improve its social acceptability and application. However, when the transformation requires collaboration across sectors (government, industry, research) and the culture for doing so is relatively weak, there remains a big risk that even a comprehensive policy approach might fail to reach the target.

Sources:

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